

# **Financial Disclosure and Stock Price Volatility: Evidence from Portugal and Belgium**

## **Abstract**

This paper attempts to provide evidence on the determinants of reporting transparency and its impact on stock price volatility, analysing the disclosure practices of two European countries. We proxy for transparency by manually constructing two indexes scores for the sample firms. We assess the differences in disclosure practices between Portuguese firms and a matched sample of Belgian firms, applying a transparency and a volatility model. We find evidence that Portuguese firms are less transparent than the Belgian ones, concerning the subjects of ownership and governance. The results show that larger and more profitable firms are more transparent. For separate samples of Belgian and Portuguese firms, and based on annual reports information, we find no evidence of an association between transparency and price volatility. However, considering the quarterly reports, we find a negative relation between these variables for the second quarter, suggesting that the higher the transparency, the lower the stock price volatility. Analysing two small European countries with relative lack of research contributes to the recent literature on the information transparency investigating economic consequences of variations in disclosure (stock price volatility).

**Keywords:** *disclosure, transparency, stock price volatility, information asymmetry, accounting standards.*

## **1. Introduction**

In a society depending on real time information, corporate disclosure is crucial for the capital market efficiency. The more disclosures a company makes, the more transparent becomes the information to investors, the lower becomes the information asymmetry and more credible the firms will be for the market, resulting in a stock price increase (Healy and Palepu, 2001). The transparency quality may also be assessed by the information provided by external quality auditors as well as by financial analysts. In addition, transparency strengthens both the foreign and the domestic investment, contributing also for an increase in the market liquidity and a decrease in the cost of capital.

In this context, we analyse the disclosure situation of Portuguese listed firms, matching with a sample of another European country, Belgium.

The relevance of this paper is based on several reasons. First, it contributes to the recent literature on the information transparency and its impact on stock price volatility (e.g., Bushee and Noe, 2000; Baumann and Nier, 2004; Frutos and Manzano, 2005). Second, it can be of interest to both managers and investors, because of the influence of transparency on domestic and foreign investments. Finally, it analyses two European small markets, with relative lack of research. Both countries are characterized as civil law countries, having a lower quality of legal protection of investors than common law countries, such as the UK and the United States (La Porta *et al.*, 1998; 2000). However, we believe that Belgian firms are more likely to be operating in a shareholder-oriented environment, where ownership is less concentrated and investors need a greater extent on information to make their investment decisions, while Portuguese firms are more likely to be operating in a stakeholder-oriented environment. In addition, the two countries have different requirements regarding the management report,

such as the social balance sheet. Consequently, the disclosure practices of the firms may differ.

The paper proceeds as follows. The next section provides a literature review. Section three describes the methodology, the hypotheses and the data. Section four reports the empirical results and the robustness checks. Finally, section five concludes the paper.

## **2. Previous Literature**

The literature suggests that financial transparency causes several benefits for firms. It is, for example, a means of reducing the cost of capital and increasing the market liquidity (Healy and Palepu, 2001; Lang and Maffett, 2010<sup>1</sup>). Several authors found a negative relationship between the level of disclosure and the cost of capital (Klein and Bawa, 1976; Botosan, 1997; Barry and Brown, 1985; Handa and Linn, 1993; Coles *et al.*, 1995; Clarkson *et al.*, 1996) and a positive relation between market liquidity and the level of disclosure (Diamond and Verrecchia, 1991; Welker, 1995; Botosan, 1997; Brunnermeier and Pedersen, 2009). Seyoum (2009) concludes that companies that are not transparent are associated with more transactions cost than the transparent ones. Furthermore, Botosan (1997), Sengupta (1998) and Botosan and Plumlee (2002) found evidence of lower equity and debt costs in firms with higher levels of disclosure. Diamond (1985) finds that the cost of private information acquirement is reduced by information disclosure, concluding that the release of information brings a benefit and not a loss to shareholders. This assumption is justified by information cost savings and risk share, and subscribed by other authors, such as Collins and Salatka (1993), Kim (1993), Welker (1995) and Hail and Leuz (2009).

Leuz and Verrecchia (2000), analysing the German market, conclude that the information asymmetry declines with the level of disclosure increasing, and it is well documented that information asymmetry influences the market efficiency. Diamond and Verrecchia (1991),

Verrecchia (2001) and Zhang (2001) find a negative relationship between the level of information asymmetry and the market efficiency.

There is also the evidence of a negative relationship between firm disclosure and price volatility, which can be justified by several reasons. First, the information asymmetry decreases with more transparency, allowing stock price volatility smoothing. Second, if firms send regularly information to the market, the impact of new information about its performance will decrease, causing a lower variation on prices. Finally, with more transparency, the firms valuation will be more consensual for the investors, thus the volatility will be reduced. The idea that the quality of disclosure and transparency could diminish the firms' stock price volatility can motivate companies to disclose more information.

Coles *et al.* (1995) and Sengupta (1998), among many others, conclude that the expected return and risk decreases as the disclosure increases, causing a smooth in the stock price volatility. Lee and Chung (1998) analyse 54 small listed firms in the Korean Stock Market, for the period from 1991 to 1993, concluding that open limit order book reduces stock market volatility, which leads to a more efficient market, with fair prices. Bushee and Noe (2000) conclude that, in the US market, better disclosure gives a good signal to the market, removing the uncertainty caused by the non-liberation of information. Consequently, it results in a reduction of prices volatility. They document a higher volatility in small companies and justify it with a "corporate disclosure". The authors conclude that the smooth behaviour on stock prices decreases the firms' cost of capital. However, they demonstrate that the effect of disclosure on volatility is complex, and may depend on the type of investors attracted to the firm. Analysing the financial sector, from 1993 to 2000, Baumann and Nier (2004) found also a negative relationship between disclosure and volatility.

Alves and Santos (2008) analyse earnings announcements, as well as the respective informativeness of quarterly financial reporting of Portuguese firms in the period from 1994

to 2004. Their results suggest that the first and third quarters information is also significantly related with price volatility and trading volume, suggesting informativeness of financial reporting for all the quarters.

Ding *et al.* (2008) analyse the transparency of 63 firms of Baltic States of Estonia, Latvia and Lithuania, and compared them with 58 firms from Nordic countries (Denmark, Finland and Sweden), using two proxies of financial transparency. The main conclusion achieved in the comparison between the two regions is that Baltic countries have a lower level of financial transparency than the Nordic ones. The authors found a negative relationship between transparency and volatility for both measures in the Nordic countries, and for one of the measures in the Baltic sample. Thus, the authors conclude that Baltic investors are only interested in financial information, whereas in Nordic countries, investors give also relevance to information towards governance and ownership. Frutos and Manzano (2005) compare a transparent and an obscure market. They conclude that the opaque market presents more volatile prices and less price efficiency.

The demand for ownership structure generates the need of quality accounting information (Ding *et al.*, 2007). When the ownership structure is highly concentrated, there is less demand of information. Indeed, previous studies find a negative relationship between disclosure and ownership concentration (Arcay and Vázquez, 2005; Laidroo, 2009, among others).

Transparency generates also benefits for the global economy. Foreign direct investment increases with the corporate transparency (Seyoum, 2009; Bhardwaj *et al.*, 2007; Razin and Sadka, 2007). Based on the assumptions of the behavioural finance, Bradshaw *et al.* (2004) argue that the main cause of home bias is the inability of many foreign firms to attract the initial attention of investors, concluding that investors tend to spend their money in a larger amount of domestic equities, despite the payback of foreign equities. The inability to attract

foreign investors could be eliminated with more efforts to improve financial reporting practices (Ding *et al.*, 2008).

### **3. Hypotheses, Methodology and Data**

In order to analyse the phenomenon of information transparency, we start to choose the proxies to measure transparency. After, we consider a transparency and a volatility model.

#### **3.1. Methodology and Hypotheses**

##### ***3.1.1. Disclosure indices***

The relation between transparency indices and disclosure is documented by Singhvi and Desai (1971) and Lang and Lundholm (1993). Nevertheless, it is quite difficult to measure the disclosure level because the application of the index could be slightly subjective and every item is not necessarily relevant to all firms. Raffournier (1995) stated that there is a framework of indices being no relevant.

We decide to consider two indices extensively used in prior studies to measure transparency: Center for International Financial Analysis & Research (CIFAR), related with specific types of accounting policies, including, for example, items from the income and cash flow statements, as well as balance sheet, and the Standard & Poor's (2002) Transparency & Disclosure index (S&P), which includes items of voluntary types of disclosure, such as information about the ownership structure and governance. Appendices A and B present the list of discretionary items considered in the CIFAR and S&P indices, respectively.

To obtain the indices score, we analyse the information provided in firms' annual financial reports<sup>2</sup>. The total points obtained by a specific firm are computed, for the two indices, by the following formulas:

$$SCORE_{i,j} = \sum_{i=1}^{78} CIFAR_j \quad [1]$$

$$SCORE_{sep_{i,j}} = \sum_{i=1}^{96} S \& P_j \quad [2]$$

The sums of  $SCORE_{i,j}$ , measuring CIFAR, and  $SCORE_{sep_{i,j}}$ , measuring S&P, go through the total number of points awarded to the firm  $j$  for all the questions  $i$ , with  $i = 1...78$  for CIFAR and  $i = 1...96$  for S&P index.

### **3.1.2. Transparency Model**

According prior literature, financial disclosure is positively related to several firm-specific variables, such as the size of the firm (King *et al.*, 1990; Botosan and Plumlee, 2002; Hope, 2003; Taylor *et al.*, 2008), profitability (Lang and Lundholm, 1993; Armitage and Marston, 2008), their auditors rating (Hope, 2003; Bushman *et al.*, 2004; Hope *et al.*, 2008) and equity offer (e.g., Lang and Lundholm, 1997).

Consequently, we formulate first hypothesis, in order to analyse whether transparency is dependent from firm-specific variables:

*H<sub>1</sub>: “The transparency score is positively associated with firm size, leverage, profitability, auditor and equity offer, and negatively associated with ownership.”*

The results concerning the relationship between transparency and leverage are not consensual. However, we hypothesized that leverage increases the firm’s transparency because these firms will be nearer to their creditors, having different ways of divulging social responsibility.

To test the first hypothesis, we estimate the following ordinary least square (OLS) model:

$$\begin{aligned} \text{Transparency} = & \beta_0 + \beta_1 \text{Portugal} + \beta_2 \text{Size} + \beta_3 \text{Leverage} + \beta_4 \text{Profitability} + \\ & + \beta_5 \text{Auditor} + \beta_6 \text{Equity Offer} + \beta_7 \text{Ownership} + \mu_i \end{aligned} \quad [3]$$

where:

Transparency	=	disclosure score based on one of two indices (CIFAR or S&P);
Portugal	=	dummy variable that takes the value one if the company is Portuguese (PT) and zero otherwise;
Size	=	logarithm of total assets;
Leverage	=	ratio of total debt over total assets;
Profitability	=	return on equity (ROE) of the firm, computed as the income before extraordinary items divided by book value of equity, relative to the ROE of the industry;
Auditor	=	dummy variable that take the value one if the company is audited by a Big 4 firm and zero otherwise;
Equity Offer	=	dummy variable that take the value one if the company arranged an equity offer during 2008, and zero otherwise;
Ownership	=	voting rights of the three biggest shareholders of the company;
$\mu_i$	=	Error term.

We present a brief summary of the independent variables included in our regression model:

### ***Size***

The firm size is considered as one of the most important variables related with the level of transparency (Lang and Lundholm, 1993). Several authors find evidence of a positive relationship between firm size and the release of information, such as Watts and Zimmerman (1978), King *et al.* (1990), Botosan and Plumlee (2002), Hope (2003) and Taylor *et al.* (2008), among others. Although size is measured in several different ways (for example,



considering the sales and the number of employees), we measure firm size as the logarithm of total assets to reduce the impact of skewed data in the statistical analysis. This measure of size is frequently used, such as in the studies of Allen and Rachim (1996), Ding *et al.* (2008), Lopes and Rodrigues (2007), Taylor *et al.* (2008) and Cho *et al.* (2010).

### ***Leverage***

The results concerning the relationship between information disclosure and the firm leverage are not consensual. Some authors find a positive relationship between the two variables (Roberts, 1992; Choi, 1999; Purushotaman *et al.*, 2000; Taylor *et al.*, 2008) and others found a negative relation (Belkaoui and Karpik, 1989; Chow and Wong-Boren, 1987). In contrast, Branco and Rodrigues (2008) find no evidence of a significant relationship between leverage and disclosure and Roberts (1992) states that it depends on the degree the company relies on its debt financing. Thus, the signal of the leverage variable is ambiguous<sup>3</sup>. We measure leverage variable by the ratio of total debt/total assets, like in the studies of Belkaoui and Karpik (1989), Depoers (2000), Branco and Rodrigues (2008) and Ding *et al.* (2008), among others.

### ***Profitability***

Several studies document a positive relationship between the disclosure level and the firms profitability, such as Roberts (1992), Lang and Lundholm (1993) and Armitage and Marston (2008). The same conclusion was reached by Singhvi and Desai (1971), but only for the univariate test, because for the multivariate test, this determinant appears to be non-significant. To measure this variable, we follow the work of Ding *et al.* (2008).

### ***Auditor***

The audits indicator is a measure of the reliability of financial accounting disclosures (Bushman *et al.*, 2004). Consequently, we expect that the better the quality of audits, the

higher the transparency of the firm. Following previous studies (Hope, 2003; Ding *et al.*, 2008; Hope *et al.*, 2008; Bushman *et al.*, 2004), we use the “Big 4” proxy to measure the audit quality.

### ***Equity Offer***

The extant literature generally suggests that firms with equity offers have more incentive to disclose information than the firms without them. According Healy and Palepu (1993), managers with the concern of equity are aware that is very important to the issuer to create a good feeling in the investors. The level of disclosure could be seen as a firm’s forward scenario, concerning equity and debt offers or even the acquisition of another company in a stock market operation. Lang and Lundholm (1997) document a significant increase in disclosure by the firms on the six months before an equity offer, particularly when managers have issues needing some discretion.

### ***Ownership***

We include also the ownership variable because we think it might be relevant to explain transparency, because when ownership is highly concentrated, there is less demand of information (Arcay and Vázquez, 2005; Ding *et al.*, 2007; Laidroo, 2009).

#### ***3.1.3. Volatility Model***

In order to relate transparency and volatility, we formulate the second hypothesis:

*H<sub>2</sub>: “Transparency scores are negatively associated with stock price volatility.”*

We expect that the higher the transparency level, the lower the information asymmetry, allowing stock price volatility to reduce. If firms convey information to the market frequently, the impact of new information about its performance will decrease, causing a lower variation on prices. As disclosure increases, the firm’s risk decreases, causing a smooth in the stock

price volatility (Coles *et al.*, 1995; Sengupta, 1998; Lee and Chung, 1998; Bushee and Noe, 2000).

We examine whether transparency and stock price volatility are related with each other, considering, in addition, a set of control variables. The volatility model is formulated as follows:

$$\begin{aligned} \text{Volatility} = & \beta_0 + \beta_1 \text{Transparency} + \beta_2 \text{Size} + \beta_3 \text{Leverage} + \beta_4 \text{Profitability} + \\ & + \beta_5 \text{MB} + \beta_6 \text{DYield} + \text{IndEffects} + \mu_i \end{aligned} \quad [4]$$

where:

Volatility = standard deviation of share prices calculated from end-of-week share prices (annual volatility);

MB = end-of-the-year capitalization divided by book value of total common equity;

DYield = dividend yield, computed as dividend per share divided by year-end stock price;

IndEffects = fixed effects for eight industry sectors;

$\mu_i$  = Error term.

The other variables have already been defined.

Next, we present a brief summary of the control variables, not yet referred:

### ***Market-to-Book***

Stock price volatility is influenced by the market-to-book ratio (MB), used as a proxy for growth predictions, which is associated with higher future volatility (Fama and French, 1992; La Porta *et al.*, 1997; Berkman *et al.*, 2002). The expected signal for this coefficient is positive. However, Ding *et al.* (2008) find ambiguous results.

## ***Dividend Yield***

Previous studies find out a negative relationship between Dividend Yield and stock price volatility, such as the one of Allen and Rachim (1996). The higher is the dividend yield, the lower is the risk. Consequently, the expected sign for this variable is negative. However, other studies find no evidence of a significant value for the coefficient on dividend payout, such as the study of Baumann and Nier (2004) and Ding *et al.* (2008).

In what concerns the relationship between the information conveyed to the market through the financial reports and the volatility, we must be aware that, in the assumption of the market efficiency hypothesis (Fama, 1970), when the financial reports are published, the market knows already the information. Consequently, the share price is not adjusted, because it was already been adjusted.

## **3.2. The Sample**

We analyse the transparency of the Portuguese market<sup>4</sup>, using a sample of non-financial listed firms on the Euronext Lisbon (EL). We exclude financial firms because those companies should comply with strict legal requirements regarding their finance (Gaud *et al.*, 2003). The data was collected on the 2008 annual reports, from the firm's websites. When some kind of information was not found, we obtain the data from the website of the Portuguese committee of the securities market (CMVM), or Amadeus database. The Portuguese final sample consists of 45 non-financial firms (of the 56 listed on EL).

The Portuguese sample is matched with a Belgian sample, considering the firms industry and size. This Belgium choice for the matching is justified for several reasons. First, the presence of both countries in Euronext are associated with similar accounting standards, namely after the adoption of International Financial Reporting Standards (IFRS) in 2005, and it allow us to control for the possibility that disclosure differences may be related to the quotation and

trading requirements of their capital market. Second, regulation and corporate governance are similar in both markets, what is explained by the spread of the International Accounting Standards (IAS) rules. Finally, the fact that the Belgian and Portuguese stock exchange markets are relatively small is an opportunity for good matching relations between them.

Although both countries are characterized as civil law countries, having a lower quality of legal protection of investors than common law countries (La Porta *et al.*, 1998, 2000), the firms' financial reporting and disclosure practices may deviate due to variations in market demand and other institutional characteristics. Disclosure of firms from shareholder environments tends to be more transparent (Ball *et al.*, 2000), which is the case of Belgium, compared to Portugal.

The non-financial listed firms on Euronext Brussels (EB) amounts to 171. To create a proportion between the two markets, we use the matching method. After removing the firms simultaneously listed on other stock Exchanges, the sample was grouped according the *Industry Classification Benchmark* (ICB). Finally, it is obtained the Belgian matched sample, according the size of the companies. Four of the Belgian firms were used twice as a matching pair for some of the Portuguese firms because of the lack of Belgian companies, namely in what concerns the industry and size criteria.

#### **4. Empirical results**

Table 1 provides the descriptive statistics for the disclosure indices for the Portuguese and the Belgian samples. For Portugal, the CIFAR index mean is 56.2, whereas for Belgium it presents a value of 54.5. In what concerns the S&P index, the higher mean is for Belgium, with a score of 58, whereas the Portuguese mean score is of 57.5. A better mean score for CIFAR in Portugal and for S&P in Belgium suggests that there are different ranges in transparency. In what concerns the maximum values, we can see that, for the CIFAR index,

the most transparent firm are from Portugal (scored with 66), but concerning S&P index the better score (79) comes from a Belgian company.

(Table 1)

The results suggest that Portuguese firms are more focuses on the spread of their accounting policies and Belgian firms are more concerned with ownership and governance disclosure.

Table 2 presents the Pearson correlation coefficients between CIFAR and S&P indices for the Portuguese and Belgian markets. Considering both countries, the correlation between the two indices is of about 43%, significant at 1% level. For the Portuguese market, the correlation between the transparency indices is relatively high (approximately 49%), and statically significant at 1% level, being a good sign that transparency is explained by these factors. However, for the Belgian market, the result is lower (38% approximately), what could be a concern. Ding *et al.* (2008) found correlation of 72.7% and 60.6%, respectively for the Baltic and Nordic markets, which denote that, for these countries, the indices are more likely to measuring transparency.

(Table 2)

Table 3 presents the descriptive statistics of the independent variables for our study (Panel A) as well as for the Ding *et al.* (2008) study, in order to compare values. Portuguese and Belgian firms' size are quite similar, being the size mean of 8.61 and 8.49, respectively. However, Portuguese firms have more leverage (0.74) than the Belgian ones (0.47). In what concerns the profitability, and considering the two markets together, the profitability is negative, with a significant number of companies presenting a negative value for earnings before extraordinary items. Indeed, 2008 was a financial and economy crisis year. However, considering the two samples separately, Portuguese firms seem to be more profitable than the Belgian ones, which

are curious, since we expect that Portugal was equally, if not more, affected by the crisis, than Belgium.

The Belgian sample has a higher percentage of firms audited by one of the BIG 4 (77.78%) than the Portuguese sample (73.33%). Furthermore, equity offer was an absent and rare event, respective by the Portuguese and the Belgian sample (2%). Finally, both Portuguese and Belgian firms present a high level of ownership concentration with a Belgian mean of 60.3% and a Portuguese mean of 64%.

(Table 3)

Comparing these results with the ones of Ding *et al.* (2008), in Panel B, it is observed that, globally, both the Baltic and the Nordic firms' present higher size, have lower leverage, higher profitability, higher percentage of auditors from BIG 4, and similar number of equity offers. The exception is the fact that Nordic firms have a lower level of ownership concentration (about 47.68%).

Table 4 shows the correlation coefficients between the transparency indices, the Portuguese coefficient and the control variables. Both the CIFAR and S&P indices present a non significant correlation with PT. Disclosure correlates positively and significantly with the firm size and the auditor quality. In what concerns the correlation coefficients among the control variables, the results show a positive and significant correlation between SIZE and both AUDITOR and EQUITY OFFER, as well as a positive correlation between PROFITABILITY and OWNERSHIP, at 5% level. However, these coefficients are not very high (always below 50%), so it does not appear to be sufficiently large to cause concern about multicollinearity problems. All the other coefficients present not statistically significance.

(Table 4)

Table 5 reports the results of the OLS transparency regression model [3], analysing the relation between disclosure levels (measured by the CIFAR and S&P indices) and the firm-specific variables. We correct for heteroscedasticity using the White (1980) method.

The coefficients that explain transparency, considering both the CIFAR and the S&P indices are the firm SIZE, PROFITABILITY and EQUITY OFFER, all of them with the expected signal (positive), except the EQUITY OFFER, in the S&P case. Ding *et al.* (2008) find also a negative value for this coefficient in the S&P measure, however, close to zero.

(Table 5)

Regarding the SIZE of the firm, it could be seen that bigger firms will have better scores of transparency. Size will generate an increase in the CIFAR score of about 1.91, and 4.47 on the S&P index. Although the coefficient on PROFITABILITY is not economically significant, it is statistically significant at the 1% level. The evidence of a positive relationship between disclosure level and the firms' profitability, suggests that managers may be more motivated to disclosure information when profitability is high.

Globally, these results suggest that firms that present higher level of transparency tend to present larger size and higher profitability, which is consistent with the results of Singhvi and Desai (1971), Lopes and Rodrigues (2007), Branco and Rodrigues (2008), Ding *et al.* (2008) and Cho *et al.* (2010).

Consequently, we find evidence supporting hypothesis one ( $H_1$ ), in what concerns the firm-specific variables SIZE and PROFITABILITY and some evidence for the coefficient EQUITY OFFER.

Comparing the adjusted  $R^2$ , we can see that transparency is better explained by the S&P measure than by the CIFAR (13.4% versus 8.9%, respectively). However, it seems that for both cases the regressions are not strong enough to explain the transparency.



The PT dummy is positive for CIFAR index and negative for S&P index, suggesting that Portuguese firms are more transparent than the Belgian ones in the accounting policies (CIFAR) and that the Belgian firms have a higher level of transparency than the Portuguese ones in what concerns the ownership and the governance features (S&P), which is in agreement with the results shown in Table 1. Although the coefficients are not statistically significant, they seem to be economically relevant. This evidence is in accordance with the assumption that in a shareholder oriented environment (the case of Belgium), the demand for better information transparency is strong in the area of ownership structure and corporate governance (La Porta *et al.*, 1998). Consistently, Ding *et al.* (2008) find evidence that Baltic firms are less transparent than the Nordic ones, concerning the subjects of ownership and governance (S&P index).

In order to analyse the relationship between stock price volatility and the disclosure (TRANSPARENCY), we run volatility model [4]. Table 6 shows the results. We are interested in how Portuguese and Belgian markets react, respectively, to firms' financial transparency, thus, we run separate regressions for Portuguese (Panel A) and Belgian (Panel B) firms. Two models are computed, one using the CIFAR and the other using the S&P index. The models consider the industry fixed effects that control the volatility changes due to the type of industry.

(Table 6)

For the Portuguese sample, the only variable that contributes to explain the stock price volatility is the SIZE, in a positive way, and for both indices (CIFAR and S&P), which is consistent with the results of Fama and French (1992), Allen and Rachim (1996), Baumann and Nier (2004) and Ding *et al.* (2008), for the Nordic sample. Beyond the size influence, Ding *et al.* (2008) find some evidence that profitability affects positively the stock price

volatility. The non significant coefficient leads to the conclusion that in Portugal the stock prices volatility is not influenced by the financial transparency.

In what concerns the Belgian sample, we can see that none of the coefficient presents a statistically significant value, thus, individually, none of these variables can explain the stock price volatility<sup>5</sup>.

The evidence that TRANSPARENCY is not statistically significant, suggests that CIFAR and S&P indices are not good measures to explain the stock prices volatility.

Overall, the results do not give support for the hypothesis that transparency scores are negatively associated with the stock prices volatility ( $H_2$ ), contrary to the results of Ding *et al.* (2008), but only for the S&P index.

Because we only use annual reports, it might be possible that it does not necessarily capture all aspects of firms' disclosure practices, which motivate to do robustness tests, in order to obvious this limitation.

### ***Robustness Tests***

After analysing the Table 6 results, we set a new possibility for understanding transparency. We make use of annual reports to determine the transparency and the variable employed to measure transparency stood quite unfitted to stock price volatility. However, concerning the study of the sensitivity of the stock price, it is more suitable to increase the frequency of disclosure, such as the reliable information of quarterly reports. Several authors use the quarterly reports as a proxy of disclosure, such as Lang and Lundholm (1993), Healy *et al.* (1999), Botosan and Plumlee (2002) and Alves and Santos (2008). Thus, for robustness reasons, we analyse the effect of quarterly reports on stock price volatility, considering a model of volatility similar to the model [4], formulated as follows:

$$Volatility = \beta_0 + \beta_1 TranspT1 + \beta_2 TranspS1 + \beta_3 TranspT3 + \beta_4 TranspA + \beta_5 Size + \beta_6 Leverage + \beta_7 Profitability + \beta_8 MB + \beta_9 DYield + IndEffects + \mu_i \quad [5]$$

where:

TranspT1 = CIFAR-based index with the use of first Quarterly Report;

TranspS1 = CIFAR-based index with the use of first Half-Year Report;

TranspT3 = CIFAR-based index with the use of third Quarterly Report;

TranspA = CIFAR-based index with the use of Annual Report.

We apply this model to the Portuguese sample (the base of our study), and to the CIFAR index. The number of firms is now reduced from 45 to 42, because the lack of data.

Table 7 presents the results. Comparing these results with the ones of Table 6, this model presents a greater explanatory power than the previous one (the adjusted  $R^2$  is about 0.39, against 0.27 in Table 6).

(Table 7)

In what concerns the transparency measures, only the half-year report (TRANSPS1) is statistical significant, at the 5% level. The results are not consistent with the ones of Alves and Santos (2008), for the same market. They found a significant relationship between the first and the third quarterly reports and the stock price volatility. This difference in results could be explained by the methodology chosen (they analyse press release announcements of legally required information concerning the financial statements), as well as the different period analysed.

Regarding the control variables, the results show that stock price volatility can be positively explained by SIZE and MB, and negatively by the DIVIDEND YIELD, having all the significant coefficients the expected signal. Comparing with the results of Table 6, we can see that, considering the quarterly information, stock price volatility is explained by more

variables. In addition, we find evidence that the change in CIFAR score is higher for the quarterly reports than for the annual reports. With this additional test, we find evidence of a negative relationship between transparency and the stock price volatility, for the second quarter, which is in agreement with Lee and Chung (1998), Bushee and Noe (2000) and Baumann and Nier (2004), among others. These results suggest a possibility of a relationship between transparency and volatility, with some lags.

Concluding, in the Portuguese market, it seems that transparency does not influence the investment decisions. The lack of reaction in presence of transparency could indicate some passiveness of investors, in the presence of new information. It seems that investors do not understand the information conveyed to the market or maybe the information was already known before the report's release.

## **5. Conclusion**

This study provides empirical evidence on the determinants of information disclosure and the effects of disclosure on stock price volatility for Portuguese and Belgian stock markets, using a sample of non-financial listed firms in these two markets.

The transparency, based on the disclosure on the annual reports, was measured by two indices: the CIFAR and the S&P indices. Portugal presents better scores for CIFAR based index and Belgium for S&P based index, which suggests that Portuguese firms are more concerned about disclosure from the regulation of accounting and Belgian firms are more transparent in terms of ownership structure.

We find a significant relationship between disclosure and firm SIZE, PROFITABILITY and EQUITY OFFER, giving some support to hypothesis one. This result is in agreement with the

ones of Lang and Lundholm (1997), Healy *et al.* (1999), Botosan and Plumlee (2002) and Ding *et al.* (2008), among others.

When we analyse the relationship between transparency and the stock price volatility, and considering the annual reports, we find no statistical significance between the two transparency measures (CIFAR and S&P) and volatility. Consequently, we find no evidence supporting hypothesis two. For the Portuguese sample, only the firm SIZE seems to be significantly related with the volatility, suggesting that stock prices volatility increases with the size of the companies.

For robustness reasons, we analyse also the quarterly announcements, as the quarterly information gives more detailed information across the year, what could improve the empirical results related with stock price volatility. Applying the respective model to the Portuguese sample, we find evidence of a negative relationship between transparency and the stock price volatility, for the second quarter, suggesting that this release of information is quite important for investors. These results are in agreement with the ones of Lee and Chung (1998), Bushee and Noe (2000) and Baumann and Nier (2004), among others.

Empirical evidence that stock price volatility may reduce in firms with better financial transparency, can be used by market regulators as an argument to persuade listed firms to adopt better disclosure practices. In addition, the study can be useful to both managers and investors, because higher levels of transparency attract foreign investment, allocate capital more efficiently, and foster economic growth (Ding *et al.*, 2008).

This study might have several limitations. First, we can have a potential problem of endogeneity, because the sampling is performed cross-sectionally at a single point in time (2008). Second, it is conducted in the financial crisis of 2008, which can result in biased conclusions. However, Ding *et al.* (2008) conducted a similar study for the Baltic region, in a

period of market growth (the year of 2004) and find similar results, which give some reliability to our main conclusions. Third, correlated omitted variables are also a potential problem in this paper, namely the institutional investors that are not included in the analysis may drive both transparency and volatility. Finally, volatility is likely to be a poor proxy of information asymmetry. According the market efficiency hypothesis, the share price reacts when the information is conveyed to the market for the first time. Consequently, when the financial reports are published, the share price was already been adjusted, because the market knows previously the information.

For future research, and in order to obvious some of caveats of this study, we would like to consider the following steps: extend the sample period, consider other European countries, create a single transparency measure and add trading volume as an additional proxy for information asymmetry. In addition, we would like to use press news rather than financial reports to relate to volatility (Alves and Santos, 2008). Moreover, there is potential interest for additional study on the specific aspects of transparency and crisis periods, which affect liquidity risk (Lang and Maffett, 2010).

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## **Appendix A: List of Discretionary Items considered in CIFAR-based Index**

### **A: General information**

- 1-Address/Telephone/Fax/Telex
- 2-Product Segment
- 3-Geographic Segment
- 4-Management Information
- 5-Subsidiaries Information
- 6-Future plans/Chairman or CEO's Statement
- 7-Number of Employees
- 8-Fiscal Year-End

### **B: Income Statement**

- 9-Consolidated Income Statement
- 10-Cost of Goods Sold
- 11-Complete Income Statement
- 12-Sales
- 13-Selling, General and Administrative Expenses
- 14-Operating Income
- 15-Foreign Exchange Gains/Losses
- 16-Extraordinary Gains/Losses
- 17-Income Tax Expense
- 18-Minority Interest
- 19-Net Income Reported

### **C: Balance Sheet**

- 20-Complete Balance Sheet
- 21-Current Assets Separated from Fixed Assets
- 22-Current Liability Separated from LT Liability
- 23-Owners' Equity Separated from Liability
- 24-Cash and Cash Equivalents
- 25-Accounts Receivable
- 26-Inventories
- 27-Current Assets
- 28-Fixed Assets on Asset Side
- 29-Goodwill and Other Intangibles
- 30-Shareholders' Equity Changes
- 31-Appropriation of Retained Earnings

### **D: Funds flow / Cash flow**

- 32-Cash Flow Statement
- 33-Complete Cash/Fund Flow Statement

### **E: Accounting Policies**

- 34-Accounting Standards
- 35-Financial Statements Cost Basis
- 36-50% Long-Term Investments
- 37-Starting Point for Funds Statement
- 38-Research & Development Costs
- 39-Pension Costs
- 40-Reasons for Extraordinary Items
- 41-Inventory Costing Method
- 42-20% Long-Term Investments

(continue)

## **Appendix A (continued)**

43-21-50% Long-Term Investments  
44-Acquisition Method  
45-Accounting for Goodwill  
46-Deferred Taxes  
47-Outside Manager of Pension Funds  
48-Long-Term Financial Leases  
49-Foreign Currency Translation Method  
50-Foreign Currency Translation Gains / Losses  
51-Discretionary Reserves  
52-Minority Interest  
53-Contingent Liabilities

### **F: Stockholders' Information**

54-Dividend per Share  
55-Earnings per Share  
56-Number of Shares Outstanding  
57-Multiple Shares  
58-Par Value  
59-Total Dividends  
60-Stock Split / Dividend / Rights Issues  
61-Stock Price  
62-Stock Exchange Listing  
63-Volume Traded  
64-Diluted Earnings Per Share  
65-Changes in Capital  
66-Different Div. for Multiple Classes of Shares  
67-EPS for Multiple Classes of Shares  
68-Significant Shareholders  
69-Composition of Shareholdings

### **G: Supplementary Information**

70-Earnings per Share Numerator  
71-Earnings per Share Denominator  
72-Notes to Accounts  
73-Disclosure of Subsequent Events  
74-Remuneration of Directors and Officers  
75-Research & Development Costs  
76-Capital Expenditure  
77-List of Board Members and Their Affiliations  
78-Exports; Financial Summary

### **Removed from the scoring**

Funds Flow Statement  
Funds from Operations  
Funds Definition (Replaced by Cash Flow Statement)  
Quarterly/Interim Dividends (Dividends payed once a year)  
Separation of Non-Equity Reserves and Retained Earnings  
Total Assets Can Be Derived (Items outdated)

## **Appendix B: List of Discretionary Items considered in S&P-based Index**

### **Ownership Structure and Investor Relations (S&P Ownership)**

Does the company in its annual accounts disclose?

1. The number of issued and outstanding ordinary shares disclosed?
2. The number of issued and outstanding other shares disclosed (preferred, non-voting)?
3. The par value of each ordinary share disclosed?
4. The par value of each other shares disclosed (preferred, non-voting)?
- 5 number of authorized but unissued & outstanding ordinary shares disclosed?
- 6 number of authorized but unissued & outstanding other shares disclosed?
- 7 par value of authorized but unissued & outstanding ordinary Shares disclosed?
- 8 par value of authorized but unissued & outstanding other shares disclosed?
- 9 top 1 shareholder?
- 10 top 3 shareholders?
- 11 top 5 shareholders?
- 12 top 10 shareholders?
- 13 description of share classes provided?
- 14 review of shareholders by type?
- 15 number and identity of shareholders holding more than 3%?
- 16 number and identity of shareholders holding more than 5%?
- 17 number and identity of shareholders holding more than 10%?
- 18 percentage of cross-ownership?
- 19 existence of a Corporate Governance Charter or Code of Best Practice?
- 20 Corporate Governance Charter / Code of Best Practice itself?
- 21 details about its Articles of Association. (e.g. changes)?
- 22 voting rights for each voting or non-voting share?
- 23 way that shareholders nominate directors to board?
- 24 way shareholders convene an EGM?
- 25 procedure for putting inquiry rights to the board?
- 26 procedure for putting proposals at shareholders meetings?
- 27 review of last shareholders meeting? (e.g. minutes)
- 28 calendar of important shareholders dates?

### **Financial Transparency & Information Disclosure (S&P Finance)**

Does the company in its annual accounts disclose:

- 1 its accounting policy?
- 2 the accounting standards it uses for its accounts?
- 3 accounts according to the local accounting standards?
- 4 accounts according to an internationally recognized accounting standard (IAS/US GAAP)?
- 5 its balance sheet according to international accounting standard (IAS/US GAAP)?
- 6 its income statement according to international accounting standard (IAS/US GAAP)?
- 7 a basic earnings forecast of any kind?
- 8 a detailed earnings forecast?
- 9 financial information on a quarterly basis?
- 10 a segment analysis (broken down by business line)?
- 11 the name of its auditing firm?
- 12 a reproduction of the auditors' report?
- 13 how much it pays in audit fees to the auditor?
- 14 any non-audit fees paid to auditor?
- 15 consolidated financial statements (or only the parent/holding co)?
- 16 methods of asset valuation?
- 17 information on method of fixed assets depreciation?
- 18 a list of affiliates in which it holds a minority stake?

(continue)



## Appendix B (continued)

- 19 a reconciliation of its domestic accounting standards to IAS/US GAAP?
- 20 the ownership structure of affiliates?
- 21 details of the kind of business it is in?
- 22 details of the products or services produced/provided?
- 23 output in physical terms? (number of users etc.)
- 24 characteristics of assets employed?
- 25 efficiency indicators (ROA ROE etc.)
- 26 a discussion of corporate strategy?
- 27 any plans for investment in the coming year(s)?
- 28 detailed information about investment plans in the coming year(s)?
- 29 an output forecast of any kind?
- 30 an overview of trends in its industry?
- 31 its market share for any or all of its businesses?
- 32 a list/register of related party transactions?
- 33 a list/register of group transactions?

### Board and Management Structure and Process (S&P Governance)

Does the company in its annual accounts disclose:

- 1 a list of board members (names)?
- 2 details about directors (other than name/title)?
- 3 details about current employment/position of directors provided?
- 4 details about previous employment/positions provided?
- 5 when each of the directors joined the board?
- 6 classification of directors as an executive or an outside director?
- 7 a named chairman listed?
- 8 detail about the chairman (other than name/title)?
- 9 details about role of the board of directors at the company?
- 10 a list of matters reserved for the board?
- 11 a list of board committees?
- 12 the existence of an audit committee?
- 13 the names on the audit committee?
- 14 the existence of a remuneration/compensation committee?
- 15 the names on the remuneration/compensation committee)?
- 16 existence of a nomination committee?
- 17 the names on the nomination committee?
- 18 the existence of other internal audit functions besides the Audit Committee?
- 19 the existence of a strategy/investment/finance committee?
- 20 the number of shares in the company held by directors?
- 21 a review of the last board meeting? (e.g. minutes)
- 22 whether they provide director training?
- 23 the decision-making process of directors' pay?
- 24 the specifics of directors' pay (e.g. the salary levels etc.)?
- 25 the form of directors' salaries (e.g. cash, shares, etc.)?
- 26 the specifics on performance-related pay for directors?
- 27 the decision-making of managers' (not Board) pay?
- 28 the specifics of managers' (not on Board) pay (e.g. salary levels etc.)?
- 29 the form of managers' (not on Board) pay?
- 30 the specifics on performance-related pay for managers?
- 31 the list of the senior managers (not on the Board of Directors)?
- 32 the backgrounds of senior managers disclosed?
- 33 the details of the CEO's contract disclosed?
- 34 the number of shares held by the senior managers disclosed?
- 35 the number of shares held in other affiliated companies by managers?

**Table 1**

## Descriptive Statistics for disclosure indices

This table shows a descriptive statistics for the disclosure indices for the Portuguese and the Belgian samples. It also reports the t-test for equality of means.

	PORTUGAL		BELGIUM	
	CIFAR	S&P	CIFAR	S&P
<i>Mean</i>	56.2	57.5	54.5	58
<i>Median</i>	57	59	56	58
<i>Maximum</i>	66	73	62	79
<i>Minimum</i>	39	28	41	40
<i>Std. Dev.</i>	5.7	9.5	5.5	8.2
<i>Q1</i>	54	54	52	54
<i>Q3</i>	59	65	58	61
<b>t-test for equality of means</b>				
	<i>t</i>		<i>Sig.</i>	
CIFAR (Portugal and Belgium)	1.988	*	0.053	
S&P (Portugal and Belgium)	0.534		0.596	

\* Significantly different from zero at the 10% level

**Table 2**

**Pearson Correlation Coefficients between CIFAR and S&P based indices**

This table presents the Pearson correlation coefficients between CIFAR and S&P indices for the Portuguese and Belgian markets.

Countries	N	Correlation	
Both Portuguese and Belgian countries	90	0.4270	***
Portugal	45	0.4888	***
Belgium	45	0.3769	***

\*\*\* Significantly different from zero at the 1% level

**Table 3****Descriptive Statistics for independent variables**

This table reports some descriptive statistics for the independent variables. SIZE is computed as the logarithm of total assets; LEVERAGE is the ratio of total debt over total assets; PROFITABILITY is the return on equity (ROE) of the firm, computed as the income before extraordinary items divided by book value of equity, relative to the ROE of the industry; AUDITOR is a dummy variable that takes the value one if the company is audited by a Big 4 firm, and zero otherwise; EQUITY OFFER is a dummy variable that take the value one if the company arranged an equity offer during 2008, and zero otherwise; OWNERSHIP is determined by the voting rights of the three biggest shareholders of the company. Panel A presents our results and Panel B presents the results of Ding *et al.* (2008).

<b>Panel A: Our study results</b>						
<b>Variable</b>	<b>BELGIUM AND PORTUGAL</b>		<b>PORTUGAL</b>		<b>BELGIUM</b>	
	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation
SIZE	8.5482	0.7425	8.6081	0.7321	8.4883	0.7562
LEVERAGE	0.6049	0.6735	0.7419	0.8995	0.4680	0.2647
PROFITABILITY	-27.5797	278.3622	1.1852	8.6101	-56.3446	393.6566
AUDITOR	0.7556	0.4322	0.7333	0.4472	0.7778	0.4204
EQUITY OFFER	0.0111	0.1054	0	0	0.0222	0.1491
OWNERSHIP	0.6216	0.2125	0.6401	0.2035	0.6030	0.2219

  

<b>Panel B: Ding <i>et al.</i> (2008) results</b>						
<b>Variable</b>	<b>BALTIC AND NORDIC REGIONS</b>		<b>BALTIC REGION</b>		<b>NORDIC REGION</b>	
	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation
SIZE	18.296	1.539	17.755	1.236	18.877	1.629
LEVERAGE	0.452	0.200	0.391	0.210	0.517	0.166
PROFITABILITY	-0.008	0.237	-0.011	0.188	-0.004	0.282
AUDITOR	0.850	0.363	0.840	0.368	0.850	0.361
EQUITY OFFER	0.070	0.261	0.070	0.258	0.080	0.267
OWNERSHIP	61.54	25.80	74.42	19.21	47.68	24.87

**Table 4****Correlation Coefficients of variables for both countries together**

This table reports the correlation coefficients between the transparency coefficients for the two countries, the Portuguese coefficient and the control variables. SIZE is computed as the logarithm of total assets; LEVERAGE is the ratio of total debt over total assets; PROFITABILITY is the return on equity (ROE) of the firm, computed as the income before extraordinary items divided by book value of equity, relative to the ROE of the industry; AUDITOR is a dummy variable that takes the value one if the company is audited by a Big 4 firm, and zero otherwise; EQUITY OFFER is a dummy variable that take the value one if the company arranged an equity offer during 2008, and zero otherwise; OWNERSHIP is determined by the voting rights of the three biggest shareholders of the company.

	CIFAR	S&P	PT	SIZE	LEVERAGE	PROFITABILTY	AUDITOR	EQUITY OFFER
PT	0.1329	-0.0195						
SIZE	0.3166***	0.3811***	-0.0213					
LEVERAGE	0.0579	-0.0610	0.1619	0.1308				
PROFITABILITY	0.0757	0.0788	0.0971	-0.1413	-0.0209			
AUDITOR	0.2327**	0.2921***	-0.0380	0.4183***	-0.1376	-0.0543		
EQUITY OFFER	0.1255	-0.0215	-0.0992	0.1928*	0.0162	0.0127	0.0603	
OWNERSHIP	-0.0773	-0.0219	0.1287	-0.1079	0.0174	0.2401**	-0.0846	0.1643

\*\*\* Significantly different from zero at the 1% level  
 \*\* Significantly different from zero at the 5% level  
 \* Significantly different from zero at the 10% level

**Table 5****Regression Results - Determinants of disclosure levels**

The table shows the OLS estimates of the transparency model, considering both the CIFAR and the S&P disclosure indices:

$$\text{Transparency} = \beta_0 + \beta_1 \text{Portugal} + \beta_2 \text{Size} + \beta_3 \text{Leverage} + \beta_4 \text{Profitability} + \\ + \beta_5 \text{Auditor} + \beta_6 \text{Equity Offer} + \beta_7 \text{Ownership} + \mu_i$$

where PORTUGAL is a dummy variable that takes the value one if the company is Portuguese, and zero otherwise; SIZE is computed as the logarithm of total assets; LEVERAGE is the ratio of total debt over total assets; PROFITABILITY is the return on equity (ROE) of the firm, computed as the income before extraordinary items divided by book value of equity, relative to the ROE of the industry; AUDITOR is a dummy variable that takes the value one if the company is audited by a Big 4 firm, and zero otherwise; EQUITY OFFER is a dummy variable that take the value one if the company arranged an equity offer during 2008, and zero otherwise; OWNERSHIP is determined by the voting rights of the three biggest shareholders of the company, and  $\mu_{i,t}$  is an error term. It presents the coefficient values, as well as the significance level.

Variables	CIFAR			S&P		
	Coef.		Sig.	Coef.		Sig.
Intercept	38.6337	***	0.0000	17.9955		0.1082
PT	1.6990		0.1447	-0.3343		0.1082
SIZE	1.9081	**	0.0229	4.4684	***	0.0014
LEVERAGE	0.1784		0.8181	-1.0982		0.5765
PROFITABILITY	0.0026	***	0.0000	0.0043	***	0.0000
AUDITOR	1.6792		0.2203	2.8179		0.2457
EQUITY OFFER	5.3569	***	0.0013	-9.0155	***	0.0003
OWNERSHIP	-2.8278		0.2204	0.7979		0.8416
Adjusted R <sup>2</sup>	0.0894			0.1336		
N	90			90		

\*\*\* Significantly different from zero at the 1% level

\*\* Significantly different from zero at the 5% level

\* Significantly different from zero at the 10% level

**Table 6****Regression results – Effect of disclosure on stock price volatility**

The table shows the OLS estimates of the volatility model, considering both the CIFAR and the S&P disclosure indices:

$$Volatility = \beta_0 + \beta_1 Transparency + \beta_2 Size + \beta_3 Leverage + \beta_4 Profitability + \beta_5 MB + \beta_6 DYield + IndEffects + \mu_i$$

where VOLATILITY is the standard deviation of share prices calculated from end-of-week share prices (annual volatility); TRANSPARENCY is a disclosure score based on one of two indices (CIFAR or S&P); SIZE is computed as the logarithm of total assets; LEVERAGE is the ratio of total debt over total assets; PROFITABILITY is the return on equity (ROE) of the firm, computed as the income before extraordinary items divided by book value of equity, relative to the ROE of the industry; MB is the end-of-the-year capitalization divided by book value of total common equity; DYIELD is the dividend yield, computed as dividend per share divided by year-end stock price; INDFEFFECTS is the fixed effects for eight industry sectors and  $\mu_{i,t}$  is an error term. Panel A presents the results for the Portuguese sample, and Panel B presents the results for the Belgian sample. Industry Fixed effects are included in the models. It presents the coefficient values, as well as the significance level.

<b>Panel A: Stock price volatility regressed on disclosure metric and control variable for Portugal</b>				
<b>Variables</b>	<b>CIFAR</b>		<b>S&amp;P</b>	
	<b>Coef.</b>	<b>Sig.</b>	<b>Coef.</b>	<b>Sig.</b>
Intercept	-7.6632***	0.0044	-7.8163***	0.0016
TRANSPARENCY	-0.0040	0.8906	0.0009	0.9687
SIZE	1.0716***	0.0003	1.0568***	0.0010
LEVERAGE	0.1049	0.5550	0.1132	0.5566
PROFITABILITY	0.0587	0.5437	0.0125	0.4837
MB	0.0587	0.2965	0.0571	0.3024
DIVIDEND YIELD	-8.9523	0.2333	-9.0057	0.2310
Adjusted R <sup>2</sup>	0.2726		0.2721	
N	45		45	

(Continue)

\*\*\* Significantly different from zero at the 1% level

**Table 6 (continued)**

Regression results – Effect of disclosure on stock price volatility

<b>Panel B:</b> Stock price volatility regressed on disclosure metric and control variable for Belgium				
<b>Variables</b>	<b>CIFAR</b>		<b>S&amp;P</b>	
	<b>Coef.</b>	<b>Sig.</b>	<b>Coef.</b>	<b>Sig.</b>
Intercept	13.6295	0.7600	-9.1703	0.8142
TRANSPARENCY	-0.6641	0.1815	-0.4755	0.1691
SIZE	1.8587	0.6727	3.4848	0.4559
LEVERAGE	11.7928	0.3275	5.3431	0.6463
PROFITABILITY	0.0267	0.4152	0.0250	0.4406
MB	0.0319	0.4792	0.0289	0.5175
DIVIDEND YIELD	53.4223	0.1161	64.7040	0.5557
Adjusted R <sup>2</sup>	0.7858		0.7865	
N	45		45	

\*\*\* Significantly different from zero at the 1% level



**Table 7****Regression results – Effect of Quarterly Reports disclosure on stock price volatility**

The table shows the OLS estimates of the volatility model, considering the CIFAR disclosure indices:

$$Volatility = \beta_0 + \beta_1 TranspT1 + \beta_2 TranspS1 + \beta_3 TranspT3 + \beta_4 TranspA + \beta_5 Size + \beta_6 Leverage + \beta_7 Profitability + \beta_8 MB + \beta_9 DYield + IndEffects + \mu_i$$

where VOLATILITY is the standard deviation of share prices calculated from end-of-week share prices (annual volatility); TRANSPT1 is the CIFAR-based index with the use of first Quarterly Report; TRANSPS1 is the CIFAR-based index with the use of first Half-year Report; TRANSP31 is the CIFAR-based index with the use of third Quarterly Report; TRANSPA is the CIFAR-based index with the use of Annual Report; SIZE is computed as the logarithm of total assets; LEVERAGE is the ratio of total debt over total assets; PROFIT is the return on equity (ROE) of the firm, computed as the income before extraordinary items divided by book value of equity, relative to the ROE of the industry; MB is the end-of-the-year capitalization divided by book value of total common equity; DYIELD is the dividend yield, computed as dividend per share divided by year-end stock price; INDFEFFECTS is the fixed effects for eight industry sectors and  $\mu_{i,t}$  is an error term. It presents the coefficient values, as well as the significance level.

Variables	CIFAR		
	Coef.		Sig.
Intercept	-8.3583	*	0.0510
TranspT1	-0.1731		0.2397
TranspS1	-0.0344	**	0.0486
TranspT3	0.2005		0.1770
TranspA	-0.0110		0.6931
SIZE	1.2795	***	0.0001
LEVERAGE	0.1466		0.4381
PROFITABILITY	0.0091		0.6105
MB	0.1524	**	0.0243
DIVIDEND YIELD	-17.4694	**	0.0410
<i>Adj. R<sup>2</sup></i>			0.3885
<i>N</i>			42

\*\*\* Significantly different from zero at the 1% level  
 \*\* Significantly different from zero at the 5% level  
 \* Significantly different from zero at the 10% level

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<sup>1</sup> See Lang and Maffett (2010) for a discussion of the literature reporting transparency and suggestions for future research.

<sup>2</sup> The measures are dichotomous: we attribute the value of 1 if the information is disclosed in the firm's Annual Reports, the value of 0 if the information is not provided, and we exclude the item if the disclosure of information is irrelevant and is not provided.

<sup>3</sup> Purushothaman *et al.* (2000) analyse this ambiguity. They point that the leverage could leave to spread information in different ways because firms with higher levels of leverage will be nearest to their creditors, having different ways of divulging social responsibility.

<sup>4</sup> Portugal is one of the countries of NYSE Euronext that is clear in need of research.

<sup>5</sup> The high value of the adjusted  $R^2$  for the Belgian sample, which shows that about 78% of the variation of volatility is explained by the model, led to the investigation of the multicollinearity econometric problem. However, analysing the correlations matrix, there is no proving that multicollinearity is present in the model. Thus, this variation may be explained by the industry effects.